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July 23, 1984

RECEIVED

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J. R.

Dr. Jacob Thiessen
Mailstop E-201, Human Health Studies
Office of Health and Environmental Research
Office of the Environment
U.S. Department of Energy
Washington, D. C. 20545

SUBJECT: Congressional Investigation into Health and Safety Policies of the
Department of Energy (DOE)

Dear Dr. Thiessen:

In response to Dr. C. W. Edington's memorandum of June 27, 1984, on the
above subject, I have enclosed a factsheet on "Plutonium Studies at the Center
for Human Radiobiology (CHR)." The factsheet is in the format requested by
Dr. Edington.

Please let me know if you need more information or documentation.

Sincerely yours,



A. F. Stehney
Environmental Research Division

AFS:pat
Enclosures

cc: H. Drucker
H. J. Rauch
P. Failla
P. F. Gustafson
E. Huberman
J. Rundo

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0004161

Project Name:

Plutonium Studies at the Center for
Human Radiobiology (CHR)

Date Started: 2 January 1973

Date Terminated: Ongoing

Principal Investigators: R. E. Rowland, A. F. Stehney

Objectives of Test:

1. To determine the excretion rate of plutonium 27 years after injection.
2. To determine the retention and body distribution of plutonium.

Short Description:

In 1945-1947, 18 hospital patients of limited life expectancy were injected with plutonium in order to obtain information about the retention and organ distribution of plutonium. An important objective was to determine the relationship between the body content and the rate of excretion in order to provide data for estimating the body content of plutonium from measurements of plutonium in excreta (bioassay). The results of this study were described in Report LA-1151 (1950).

The data in LA-1151 were reviewed in a manuscript prepared by P. W. Durbin for publication in the 1972 volume, Radiobiology of Plutonium. (2) Tissue and bone samples had been obtained at autopsy from six of the cases at times ranging from 5 days to 456 days after injection, and the longest collection time for excreta was about 5 years. In addition to preparing the manuscript, Durbin traced the later history of the cases and discovered that four were still living in 1972.

The Center's direct knowledge of the plutonium injection cases dates from December 13, 1972, when Dr. Durbin brought her records to CHR for possible further follow-up. The Center then undertook to determine excretion rates in study subjects who were still alive and to exhume deceased subjects in order to determine the amounts and body distribution of plutonium. During 1973, CHR obtained metabolism samples from three living patients, obtained permission to exhume from next of kin of three deceased patients, and disinterred and transferred to CHR the remains of one of these deceased. The metabolism samples (blood and excreta) were taken at Strong Memorial Hospital (SMH), Rochester, New York.

In 1974, the U.S. Atomic Energy Commission (AEC) reviewed the origins and subsequent follow-up of the plutonium studies. On December 31, 1974, the AEC authorized CHR to proceed with the program of study of the living patients who were injected with plutonium during 1945-1947 and of the bodies of deceased individuals from that group for whom legal consent for examination is obtained.

Follow-up Data:

Table 1 summarizes CHR follow-up activities and last known status (July 5, 1984) for each of the plutonium injection cases.

CHR personnel have published 10 reports on results obtained by study of these cases. (3-12) Copies of these reports are attached.

0004162

Table 1. Plutonium injection cases: Summary of CHR activities and last known status (July 5, 1984).

| Old Case Number | CHR Case Number | CHR Activities | Status |
|-----------------|-----------------|--|---------------------|
| Cal-I | 40-001 | 10/16/75: Exhumed cremains —Aug 78: Returned | Died 1/9/66 |
| Cal-II | 40-002 | No contacts; said to have died in Australia | Died 1/6/47 |
| Cal-III | 40-003 | 6/11/73: Examined at CHR 6/23-26/77: Metabolism study at SMH | Living 10/19/83 |
| Chi-1 | 40-004 | 6/10/75: Exhumed Apr 78: Returned | Died 10/3/45 |
| Chi-2 | 40-005 | No contacts; cremation ashes scattered | Died 1/13/46 |
| Chi-3 | 40-006 | No contacts; case unidentified | Lost to study, 1946 |
| HP-1 | 40-007 | 1973: Next of kin refused permission to exhume | Died 1/12/60 |
| HP-2 | 40-008 | 1973: Next of kin refused permission to exhume | Died 4/4/48 |
| HP-3 | 40-009 | 1/28-2/18/73: Metabolism study and radioactivity measurement at SMH 1/23-24/79: Metabolism study at SMH | Died after 6/5/81 |
| HP-4 | 40-010 | 9/24/73: Exhumed Jul 75: Returned | Died 4/29/47 |
| HP-5 | 40-011 | 1973: Next of kin refused permission to exhume | Died 4/29/46 |
| HP-6 | 40-012 | 2/14/73: Metabolism study at SMH 6/21-7/1/73: Metabolism study at SMH | Living 12/30/74 |
| HP-7 | 40-013 | 1973 and 1977: Next of kin refused permission to exhume | Died 10/27/46 |
| HP-8 | 40-014 | No contacts | Died 11/22/75 |
| HP-9 | 40-015 | 5/18/78: Exhumed Jul 81: Returned | Died 7/2/47 |
| HP-10 | 40-016 | No contacts | Died 6/2/57 |
| HP-11 | 40-017 | No contacts | Died 2/26/46 |
| HP-12 | 40-018 | No contacts | Died 4/13/53 |

0004163

References:

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2. P.W. Durbin. Plutonium in man: a new look at the old data. In The Radiobiology of Plutonium, B.J. Stover and W.S.S. Jee (eds.), The J.W. Press, Salt Lake city, UT, pp. 469-537 (1972).
3. J. Rundo, P.M. Starzyk, J. Sedlet, R.P. Larsen, R.D. Oldham and J.J. Robinson. The excretion rate and retention of plutonium 10,000 days after acquisition. In Diagnosis and Treatment of Incorporated Radionuclides, Proc. Seminar, Vienna, 8-12 December 1975, IAEA, Vienna, pp. 15-22 (1976).
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5. R.A. Schlenker, B.G. Oltman, and H.T. Cummins. Microscopic distribution of ^{239}Pu deposited in bone from a human injection case. In The Health Effects of Plutonium and Radium, Proc. Symp. Sun Valley, Idaho, 6-9 October 1975, W.S.S. Jee (Ed.), The J.W. Press, Salt Lake City, UT, pp. 437-450 (1976).
6. J. Rundo and F.H. Ilcewicz. Blood content and excretory plasma clearance of plutonium 10^4 days after injection. Abstracts of Papers-22nd Ann. Mtg. Health Phys. Soc., Atlanta, 3-8 July 1977, Pergamon Press, NY, p.26 (1977); Health Phys. 33, 668 (1977).
7. R.E. Rowland. The risk of bone sarcoma from plutonium-239. In Biological Implications of Radionuclides Released from Nuclear Industries, Proc. Symp., Vienna, 26-30 March 1979, Vol. II, IAEA, Vienna, pp. 211-224 (1979).
8. R.P. Larsen, R.D. Oldham, and R.E. Toohy. Macrodistribution of plutonium in the human skeleton. In Actinides in Man and Animals, Proc. Snowbird Actinide Workshop, 15-17 October 1979, M.E. Wrenn (Ed.), RD Press, Salt Lake City, UT, pp. 191-197 (1981).
9. J. Rundo. The late excretion of plutonium following acquisition of known amounts. In Actinides in Man and Animals, Proc. Snowbird Actinide Workshop, 15-17 October 1979, M.E. Wrenn (Ed.), RD Press, Salt Lake City, UT, pp. 253-260 (1981).
10. R.A. Schlenker and B.G. Oltman. Plutonium microdistribution in human bone. In Actinides in Man and Animals, Proc. Snowbird Actinide Workshop, 15-17 October 1979, M.E. Wrenn (Ed.), RD Press, Salt Lake City, UT, pp. 199-206 (1981).

0004164

11. R.A. Schlenker and B.G. Oltman. Uranium concentrations in human bone. In Actinides in Man and Animals, Proc. Snowbird Actinide Workshop, 15-17 October 1979, M.E. Wrenn (Ed.), RD Press, Salt Lake City, UT, pp. 473-476 (1981).
12. R.E. Toohey, C.G. Cacic, R.P. Larsen, and R.D. Oldham. The concentration of plutonium in hair following intravenous injection. Health Phys. 40, 881-886 (1981).

Attachments:

Reprints of references 3-12 are attached.

MAR 05 1986

0004165